

Clinical Pathology Abstracts, 1/18

Editor: Deborah Sesok-Pizzini, MD, MBA, professor, Department of Clinical Pathology and Laboratory Medicine, Perelman School of Medicine, University of Pennsylvania, Philadelphia, and chief, Division of Transfusion Medicine, Children's Hospital of Philadelphia.

Drone transport of chemistry and hematology samples over long distances

Interest in using unmanned aerial vehicles, or drones, to transport laboratory specimens is based on the need to move specimens from satellite facilities to a central hub for testing. Earlier studies of biological specimens transported by drones were performed in ambient or cold temperatures for a maximum flight length of 40 minutes. Those drone flights did not require any measures to stabilize temperature or pressure because ambient conditions were not extreme. Amukele, et al., conducted a study to examine how drone flights longer than three hours and in high ambient temperatures affected samples. The investigators recruited 21 healthy volunteers and obtained four samples from each. Half the samples were held stationary and the other half were flown for three hours (258 km) in a custom active-cooling box mounted on the drone. Nineteen of the most common chemistry and hematology tests were performed on all of the flown and stationary samples after the flight. These analytes included sodium, potassium, chloride, carbon dioxide (bicarbonate), serum urea nitrogen, creatinine, glucose, WBCs, RBCs, hemoglobin, hematocrit, mean corpuscular volume, RBC distribution width, platelet count, lymphocytes, monocytes, neutrophils, eosinophils, and basophils. The results from the flown versus stationary sample pairs were compared, using several statistical approaches, to determine differences in the samples. The majority of the analytes had small or no bias, but glucose and potassium in the flown samples showed an eight percent and 6.2 percent bias, respectively. The flown samples were also a mean of 2.5°C cooler than the stationary samples. The authors found that, with the exception of glucose and potassium, the 95 percent intervals for the sample pairs met the regulatory acceptability criteria used in the study. The glucose and potassium levels were higher overall in the flown samples. This suggests that these two analytes will require strict environmental controls for drone flights to ensure reliable results. The authors concluded that it is necessary to carefully consider the time and temperature requirements for analytes when selecting samples for drone transport.

Amukele TK, Hernandez J, Snozek CLH, et al. Drone transport of chemistry and hematology samples over long distances. *Am J Clin Pathol*. 2017;148:427-435.

Correspondence: Dr. Timothy Amukele at tamukel1@jhmi.edu

[hr]

Analysis of daily laboratory orders at a large urban academic medical center

Inappropriate laboratory test ordering may, in part, be linked to clinicians and can stem from a lack of experience or insufficient time, incentive, or training. Other factors include inadequate cost transparency and limited data-driven guidance on optimal test-ordering practices. Rudolf, et al., described a multifaceted institutionwide utilization-management initiative to change physician ordering patterns and reduce daily orders in a large urban academic medical center. The investigators used collaborative guidelines, education, decision-support alerts, and continuous auditing and feedback to drive practice changes with the support of an ad hoc committee that included representation from pathology and internal medicine. They developed a policy that, with limited exceptions, prohibited clinicians from ordering recurrent daily lab tests. They also implemented a parallel initiative to limit recurrent daily lab orders on templates (order sets) to those few tests that were determined to be clinically indicated. The results showed that annualized daily order volumes decreased from 25,000 to 10,000 during a 33-

month post-intervention review. These results represented a significant change from pre-intervention order volumes. The authors concluded that changes to inpatient order practices can be achieved through a collaborative approach to utilization management. They emphasized that auditing and continued feedback are crucial factors in changing ordering behavior. The interventions resulted in a slow but steady shift that reduced daily orders by approximately 60 percent. However, the authors noted that these changes most likely would not result in significant cost savings. Yet there were other benefits, including improved patient experience and outcomes from appropriate testing.

Rudolf JW, Dighe AS, Coley CM, et al. Analysis of daily laboratory orders at a large urban academic center. *Am J Clin Pathol.* 2017; 148:128-135.

Correspondence: Dr. Jason M. Baron at jmbaron@partners.org